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That there is an interchange of material between nucleus and cytoplasm probably all cytologists will admit, although optical evidence is at present very scanty. It seems quite possible that the whole graft hybrid and chimera question, when the cytological evidence is all in, will emphasize rather than weaken the theory that the nucleus is practically the sole bearer of hereditary characters.

In his most recent account of the chromosomes of these forms WINKLER¹⁸ finds that *Solanum tubingense*, *S. proteus*, *S. Koelreuterianum*, and *S. Gaertnerianum* are periclinal hybrids; while *S. Darwinianum*, at least in the subepidermal layer of the stem apex, is a fusion hybrid (*Verschmelzungs-Propfbastard*). The germ cells of this latter form have 48 chromosomes, and since the parents (*S. nigrum* and *S. Lycopersicum*) have 12 and 36 chromosomes as the reduced numbers, WINKLER infers that the subepidermal layer from which the pollen is derived must have 48 chromosomes; and he supposes that a *S. nigrum* cell with 24 chromosomes has fused with a *S. Lycopersicum* cell with 72, giving rise to a nucleus with 96; and that in the progeny of this nucleus the number has become reduced to 48. Another reduction would then give the required 24. This seems too complicated to be correct.

It is evident that cytological investigation of graft hybrids has only just begun. STRASBURGER early recognized the importance of such investigation, and WINKLER's splendid success in securing the grafts has reopened an attractive field for cytological research. The problems are so numerous and the time demanded for reliable results is so great that one man cannot hope to do all the work. Many have tried to find out whether there is a cytological basis for Mendelism. DEVRIES has welcomed cytological investigations of mutation and has generously furnished material for such work. If WINKLER should welcome others into the field, the facts might soon be uncovered; but if others must wait until he has finished, the task is so great and so complicated that, although a young man, he might grow old with the problem still unsolved.—CHARLES J. CHAMBERLAIN.

Plant diseases.—*Cyanospora albicedrae*, a new generic type, is reported on the mountain cedar of Texas by HEALD and WOLF.¹⁹ The fungus is a pyrenomycete of a peculiar type, having its perithecia prostrate, with the short ostecolum curved outward. The perithecia occur singly or in small groups on whitened areas on the trunks and branches. This whitening of the bark is the most characteristic symptom of the infected trees. The fungus is supposed to be a parasite, although its parasitism is not certain. The present paper is limited to a description of the fungus and its effect on the trees.

A new *Macrophoma* (*M. Phoradendri*) on *Phoradendron flavescens* (Pursh)

¹⁸ WINKLER, HANS, Ueber das Wesen der Propfbastarde. (Vorläufige Mitteilung.) Ber. Deutsch. Bot. Gesell. 28: 116-118. 1910.

¹⁹ HEALD, F. D., and WOLF, F. A., The whitening of the mountain cedar, *Sabina sabinoides* (H. B. K.) Small. Mycologia 2: 205-212. pl. 31. figs. 3. 1910.

Nutt. is described by WOLF²⁰ in the same journal. It infects the leaves, which it causes to fall.

An interesting organism belonging to the small group of parasitic slime molds (Phytophycaceae) is described by SCHWARTZ²¹ as occurring on the roots of some species of the Juncaceae. The organism belongs in the genus *Sorosphaera*, and in its development closely resembles the classic example of this group, *Plasmodiophora Brassicae* Woronin. In the earliest stages observed, the parasite consists of small multinucleate amoebae in the root hairs and outer cortical cells of the infected plants. The roots show no hypertrophy, and scarcely any other outward sign of the presence of the parasite, which can be discovered only by microscopic examination. In the vegetative stage all the nuclei of the amoebae divide simultaneously by the formation of a chromatic ring or plate surrounding an elongated karyosome. The process is identical with that described for *Plasmodiophora Brassicae*. At the beginning of spore-formation the protoplasm of the amoebae separates into a number of amoebulae, each with a single nucleus. The nuclei of the amoebulae undergo two divisions, forming four uninucleate spores. The spores remain loosely aggregated in sorospheres; their germination was not observed. The paper concludes with a brief description of *Entorhiza cypericola*, a member of the Ustilagineae inhabiting the roots of various species of *Juncus*.

BROOKS gives an account²² of the development of *Gnomonia erythrostoma*, which causes the leaf-scorch disease of the sweet cherry. The mycelium, which is intercellular in the tissues of the leaves, consists of multinucleate cells, resembling in this respect other ascomycetes except the mildews. The first fruiting organs to appear are spermatogonia, which are produced in great numbers on the lower surface of the leaves. The spermatia, which are discharged from the spermatogonia in enormous numbers, are single-celled filamentous bodies with large nuclei and little cytoplasm. This structure, which BLACKMAN has pointed out as characteristic of male cells, leads the author to regard the spermatia as abortive male cells. The perithecia originate, as in other ascomycetes, as interwoven masses of hyphae near the lower epidermis. Branches from some of the outer cells of the mass protrude through the stomata of the leaf and bear a superficial resemblance to trichogynes. No case of their functioning as such was observed, however, although it often happens that a number of spermatia become attached to the protruding hyphae, a fact easily explicable when one considers the enormous number of spermatia produced. That the projecting hyphae do not function as trichogynes is further

²⁰ WOLF, F. A., A leaf blight on the American mistletoe, *Phoradendron flavescens* (Pursh) Nutt. *Mycologia* 2:241-244. *pl.* 32. 1910.

²¹ SCHWARTZ, E. J., Parasitic root diseases of the Juncaceae. *Annals of Botany* 24:511-522. *pl.* 40. 1910.

²² BROOKS, F. T., The development of *Gnomonia erythrostoma* Pers., the cherry leaf-scorch disease. *Annals of Botany* 24:585-605. *pls.* 48, 49. 1910.

shown by the fact that they sometimes occur apart from any connection with the young ascocarps. Moreover, the development of asci proceeds in a region remote from the "trichogynes." The ascogonial hyphae are differentiated in the basal part of the mass of interwoven hyphae; they are characterized by their larger size and larger nuclei. No nuclear fusions were observed in the ascogonia, which seem to have lost their function and appear soon to degenerate. Apparently the ascogenous hyphae do not arise from them, but from other hyphae near the base of the perithecium, which appear after the ascogonia disintegrate. The asci arise from the terminal part of the ascogenous hyphae without the hook-formation common in ascomycetes. Other cells of the ascogenous hyphae may also grow out into asci. The ascus cells contain two nuclei which fuse as usual, whereupon three successive divisions occur, forming the eight spore-nuclei. The first of the three divisions is regarded as a reduction division, to counterbalance the single fusion which was observed. After the spore membrane has been formed, the nucleus of each spore divides again, a septum dividing the spore into two unequal cells being formed between the daughter nuclei.—H. HASSELBRING.

Insect galls.—The past few years have demonstrated an increasing interest in the study of cecidology, and, as in all biological subjects, the first work is taxonomic. A few of the interesting papers of the past few months are as follows: PEREZ²³ discusses the cecidia of *Eritrea*, describing 36 species of galls and one gall-maker. The descriptions are clear and the technical names of the host plants are given, but there are no figures. The VAN LEEUWEN-REIJNVAANS²⁴ discuss the cecidia of Java, describing 150 species on almost as many host plants. Most of these galls were collected at Salatiga at an elevation of about 600 meters; and they were found to be much more abundant in the moist than in the dry localities. Descriptions are given of the galls, and in many cases of the insects also, but the authors state that in describing the gall it is not necessary to describe the gall-maker, a view which is contrary to the views of some of our American entomologists, but with which the reviewer is in hearty sympathy. Most of the descriptions are accompanied by good figures. TROTTER²⁵ gives descriptions of 19 species of galls occurring on 14 host plants. His descriptions also include the bibliographies of those previously described. HOWARD²⁶ has described 52 species of Dr. SICHEL'S collection, which is deposited in the Entomological Museum of Natural History in Paris. He also mentions a number of old galls of unknown origin. MASSALONGO²⁷

²³ PEREZ, T. DE STEFANI, *Altri Zoocecidii dell' Eritrea*. Marcellia 8:7-18. 1909.

²⁴ LEEUWEN-REIJNVAAN, J. und W., DOCTORS, *Einige Gallen aus Java*. *Op. cit.* 8:21-35, 85-122. 1909; 9:37-61. 1910.

²⁵ TROTTER, A. *Nuovi Zoocecidii della Flora Italiana*. *Op. cit.* 8:50-59. 1909.

²⁶ HOWARD, C., *Les collections cécidologiques du Laboratoire d'Entomologie du Museum d'Histoire Naturelle de Paris: L'Herbier du Dr. SICHEL*. *Op. cit.* 65-78.

²⁷ MASSALONGO, C., *Galle e simili produzioni anormali*. *Op. cit.* 133-141.